

PATENT COOPERATION TREATY

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PCT

To:

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WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2004/050295

International filing date (day/month/year)
11.03.2004

Priority date (day/month/year)
31.03.2003

International Patent Classification (IPC) or both national classification and IPC
H04L27/36, H03F1/32

Applicant
MOTOROLA INC

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**International application No.
PCT/EP2004/050295

JC20 Rec'd PCT/PTO 30 SEP 2005

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2004/050295

Box No. II Priority

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	2-8, 11
	No: Claims	1, 9, 10 and 12
Inventive step (IS)	Yes: Claims	
	No: Claims	1-12
Industrial applicability (IA)	Yes: Claims	1-12
	No: Claims	

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/EP2004/050295

Re Item V.

I

The following documents are referred to in this communication:

D1 : EP0598585

D2 : US5507014

D3 : US5134718

II

1. The present application two independent claims (claims 1 and 9) under the same category, the apparatus category.

The various definitions of the invention given in these independent claims are such that the claims as a whole are not clear and concise, contrary to the requirements of Article 6 PCT. Although the above claims have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter. These claims have a substantial repetition of wording and overlapping scope, and the claims differ from each other with regard to the definition of the subject-matter for which protection is sought mainly in respect to the slightly different terminology used for the features of that subject-matter.

The claims, therefore, require revision in order to fully meet the requirements of Article 6 and Rule 6.1 PCT, since the multiplicity of independent claims (4) introduce obscurities into the exact definition of the matter for which protection is sought (Article 84).

In this case it is considered appropriate to define the claimed subject matter for the apparatus category in only one independent claim. This independent claim should then clearly designate the exact subject-matter for which protection is sought with all the features being essential for the whole exploitation of the invention. For instance, a "linearised transmitter" having the essential features of the invention could be claimed in the independent claim, with dependent claims claiming a "wireless communication unit" and a "linearised transmitter integrated circuit".

2. The following clarity deficiencies render the scope of protection of the claims further unclear, contrary to the requirements of Article 6 PCT:

- 2.1 The use of the term "*loop adjustment function*" as a part of an apparatus in claims 1, 3-4 and 9 is confusing to the reader, since a "function" is an abstract mathematical concept which can be executed in a method step but which cannot be an element of an apparatus.

A similar objection arises with the use of method steps in claims 1 and 5 ("said processor applying [...]").

This mixture of features of both categories introduces obscurities into the exact definition of the matter for which protection is sought.

- 2.2 The technical meaning of the term "*quadrature circuits*" in claim 1, is not clear (what does it mean that "the forward path and feedback loop comprise quadrature circuits"?).

- 2.3 The feature of claim 1 establishing that the first training signal and the second training signal have "*substantially the same signal parameters*" is not clear, since it is not known what is meant by the expression "signal parameters" (does it refer to the fact that these training signals have the same amplitude and phase, thus being identical?). At this point it is worth noticing that the features following an expression like "for example", as used in this claim, should be regarded as entirely optional (see PCT-Guidelines III-4.6).

This is further aggravated by the use of the relative term "substantially" in claim 2 fails to clearly define the scope of protection of the claim. In fact, such a term having no well-recognised meaning is not allowable according to the PCT-Guidelines, Chapter III-4.5 which stipulate that this term should be replaced by a more precise wording found elsewhere in the original disclosure.

- 2.4 The reference to "the first and second quadrature loops" in claim 4 is not clear, because this feature has not been previously defined.

- 2.5 Claim 12 claims protection for "*a storage medium storing processor-*

implementable instructions or data adapted to perform the steps of method claim 10 or claim 11".

The reference to the "data" adapted to perform the steps of the claims is not clear, since the technical features of the method claim cannot be directly derivable from such data and thus the storage medium, when storing data, would be claimed by itself. Besides being widely known and therefore not allowable due to lack of novelty (Article 33(2) PCT), this subject-matter is excluded from preliminary examination (see PCT-Guidelines IV-2.4(f)).

III

The claims have been interpreted in the light of the description so as to be able to give preliminary remarks regarding novelty and inventive step.

1. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.

Document D1 discloses (the references in parenthesis applying to this document) a wireless communication unit comprising a linearised transmitter (figure 1 and page 1, lines 1-3: "*The present invention relates to amplifiers, in particular of the type used in RF transmitters and concerns the implementation of the so-called Cartesian loop feed back technique to improve the linearity of such amplifiers*") having:

- a forward path for routing a signal to be transmitted having in-phase and quadrature components (page 1, line 51: "*comprising an input for a signal to be amplified*");
- a power amplifier for amplifying a linearised radio signal (page 1, line 52: "*a power amplifier for amplifying the input signal*");
- a feedback loop, operably coupled to the power amplifier and the forward path and having a pair of channels for processing "real" and "imaginary" quadrature signal components (page 1, line 53: "*a Cartesian loop feedback circuitry around the power amplifier having a pair of channels for processing real and imaginary quadrature signal components*");
- a processor for applying a first training signal made up of a pure quadrature signal to the "imaginary" path of the feedback loop through the forward path and

the power amplifier to determine at least one first parameter setting of the loop adjustment function (page 5, lines 6-7: *"the application of the test signals can be controlled as in figure 2 which shows an example implementation of the signal preprocessor"*; page 5, lines 17-18: *"the second factor can be calculated by applying two separated calibration signals to the Cartesian loop. The first consists of a known DC level on the imaginary path"* and figure 6)

- the processor being further adapted to apply a second training signal made up of a pure in-phase signal to the "real" path of the feedback loop through the forward path and the power amplifier to determine at least one second parameter setting of the loop adjustment function (page 5, lines 17-19: *"the second factor can be calculated by applying two separated calibration signals to the Cartesian loop. [...] The second consists of a known DC level on the real path"* and figure 6).

2. Dependent claim 5 further defines the processor as being adapted to apply the first training signal prior to the second training signal. This appears to indicate to the reader that independent claim 1 includes also the possibility of both signals being sent simultaneously.

According to this interpretation, the same objection concerning the lack of novelty of claim 1 (Article 33(2) PCT) can be raised in the light of document D2 (see the passages of D2 cited in the search report), which discloses a method exhibiting the features mentioned in the previous paragraph, whereby the first and the second training signal are applied simultaneously, thereby covering all the essential features of this claim.

3. Independent claims 9, 10 and 12 define the same technical aspect as claim 1 in terms of the corresponding integrated circuit, method and computer program features with only minor variations of wording between them. These features are known from document D1 and D2 (see the passages cited above). Therefore, the objection raised in the previous paragraphs 1 and 2 applies equally to claims 9, 10 and 12, which are consequently not allowable due to lack of novelty (Article 33(2) PCT).
4. It should be noted that even if the Applicant were to interpret claim 1 (or claims 9, 10 and 12) in such a manner as to enable him to allege that its subject-matter were novel, based on minor differences of interpretation between the features of these claims and those disclosed in **D1**, the subject matter of claim 1 (as well as that of

claims 9, 10 and 12) would still not involve an inventive step (see Article 33(3) PCT) with respect to the disclosure of **D1** especially as these documents disclose the same subject-matter and the same type of solution as claimed in this claim.

5. Dependent claims 2-8 and 11 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT).